NORTH DEVON MARINE PIONEER PROJECT – OUTPUT 2

WHO GETS TO FISH IN THE NDMP AREA: FISHING OPPORTUNITIES AND MANAGEMENT

Written by: Chris Williams and Griffin Carpenter

New Economics Foundation
www.neweconomics.org
info@neweconomics.org
+44 (0)20 7820 6300
@NEF

Registered charity number 1055254
© 2019 The New Economics Foundation

SECTION 1: SUMMARY OF RELEVANT EU AND UK QUOTA AND EFFORT MANAGEMENT REGIMES FOR SPECIES TARGETED IN THE NDMP AREA

- **Fishing opportunities** are the access rights granted to companies, individual fishers and members of the public that allow them to fish.
- These opportunities come in many different forms, from a fishing licence to operate a 6 metre to go potting for lobster to the quota held by a 70 metre pelagic trawler to catch 50 tonnes of herring over the year.
- Fishing opportunities aim to prevent overfishing, reduce conflict between users, and ensure good practices are upheld in utilising the natural resource. Fishing opportunities are the enforceable restrictions within which fishers can legally fish. These vary significantly in character and stringency. Some fishing opportunities come in the form of territorial rights which allow authorised fishers to harvest species in a defined territory. This kind of opportunity is most appropriate for sedentary stocks such as bivalves.
- Where stocks are not heavily fished, granting fishing opportunities is straightforward – fishers apply for a licence and they can fish relatively freely if they meet the requirements. However, for commercial fisheries, many fishers want to access the same fish and shellfish stocks and there is a risk of overfishing. In these cases, it is common for fishing authorities to distribute fishing rights (e.g. a quota limit on catches/landings) to limit access.[1]
- Authorities then consider wider socio-economic and environmental implications in how they allocate these fishing opportunities. This process is complex and often political, especially at the international and national levels. **Fishing opportunities under quota management** or other forms of 'rights-based' allocation (RBM = Rights Based Management) are the most contentious. This is because there are usually some 'winners' and 'losers' that result from quota allocation whilst for most non-quota stocks, access is usually distributed equally for licence holders. Non-quota commercial fishers under effort controls will in most cases have the same duration of fishing access across the board.
- **Catch quotas** are a type of opportunity that specify the tonnage of fish stocks that can be caught. These are most common for large commercial stocks.
- Other fishing opportunities come in the form of open fishing within **fishing seasons, limited entry and gear restrictions**. All regulated fishing opportunities include licensing arrangements that set out basic requirements which fishers must comply with. In the case of commercial fishing, licences are often fishery-specific, attached to a vessel and necessary to hold quotas.[2]

Fishing opportunities can be grouped into *quota management* and *effort management*

- **Quota management:** Fishing opportunities that impose output limits (quantitative withdrawal limits) in terms of landed or caught weight or number of fish.
    - NATIONAL QUOTAS: applied to the whole fleet and not allocated to individual fishers. Open fishing is permitted until the national quota is depleted and the fishery is closed. This type of quota is often used for fish stocks in low-demand as a method of increasing quota utilisation. National quotas are often used in the management of particular fleet segments such as the small-scale fleet. In some cases, a national quota is divided into regional quotas. Since the quota is neither secure nor exclusive, national quotas cannot be considered a form of RBM. Sometimes national quotas are referred to as the 'national pool' of quotas.
    - RATIONED QUOTAS: Rationing quotas involve centrally determined quota allocations being granted to fishers, often based on the principle of equal access. Most commonly, fishers are grouped into classes depending on vessel size, capacity or gear type. Within each class, vessels receive the same individual catch limit. Rationing usually involves many in-year allocations and the catch limits are short-term (weekly or monthly). Since rationed quotas are not a long-term, secure share they cannot be considered as a form of RBM, despite being exclusive.
    - INDIVIDUAL QUOTAS: Quota allocations are made to individual vessels based on their quota shares. Allocation is normally based on the vessel/licence historical track record of landings that confers an exclusive long-term quota share. Quotas are not directly transferable but in most systems quotas can be transferred with vessel sale. In-year swapping of quotas is usually permitted and in some cases these quotas may be pooled by a producer organisation (PO).
    - INDIVIDUAL TRANSFERABLE QUOTAS (ITQ): ITQs are similar to Individual Quotas with the added feature that the quota share is transferable and leasable. Initial allocation of ITQs are usually based on historical track records, but as ITQs are transferrable quota shares can change holders. In ITQ systems there are often regulations in place to limit the concentration of quota shares and/or to control the eligibility of quota holders.
    - COMMUNITY QUOTA systems are similar to individual quotas but are allocated to a collective unit such as a fisheries association, a producer organisation or a port. It is up to the community organisation to determine how the quota is used by its membership. The organisation is responsible for ensuring quota compliance. Community quotas are sometimes referred to as 'pooled quotas'. [3]

- **Effort management:** Fishing opportunities that impose input controls including those of a spatial nature, but excluding gear restrictions. 'Effort' normally refers to fishing activity, defined by fishing time and fishing capacity and/or power (e.g. kilowatt days at sea - DAS).
    - INDIVIDUAL EFFORT QUOTA systems grant fishers an allowance for effort (e.g. kilowatt days at sea), usually specified by gear type. Although most effort controls are not considered to be RBM, when fishers receive a secure and exclusive effort share they can be considered a form of RBM. In some cases, these permits may be transferable (ITEQ).
    - TERRITORIAL USE RIGHTS FOR FISHERIES (TURF): In TURFs, use rights come in the form of a defined territory. Fishers managed through a TURF have exclusive access to harvesting fish in the designated area. TURFs are usually managed by membership organisations that limit entry and impose catch or effort controls on members. TURFs are regarded as RBM because a defined group of fishers receive exclusive and secure access rights.
    - LIMITED LICENSING controls fishing effort by limiting the number of vessels (capacity) in the fishery. Usually accompanied by other EM measures that specify vessel capacity, permissible gears, spatial limits and target stocks as licence conditions. In some cases, licences are transferable. Some recreational licences may also include catch limits such as bag limits.
    - SPATIAL MANAGEMENT involves imposing restrictions on where vessels may fish. These are usually put in place to protect biologically sensitive/valuable areas or to prevent gear conflict. Restrictions are often based on gear type or vessel size and may also have a temporal component. Marine Protected Areas (MPAs) and fishery restricted areas can also be considered a form of spatial management.
    - FISHING SEASONS determine the times of year when a fishery is open. In many cases, fishing seasons are combined with quotas – thus restricting the period in which a catch limit applies. They are usually applied to match migratory patterns and avoid fishing during the sensitive spawning season for a species.
    - DAYS AT SEA (DAS): Individual vessels can be granted a 'days at sea' (DAS) quota. This effort quota may be allocated based on historical track records, capacity, or rationed equally. A fisher's catch is therefore limited by the amount they can fish within their DAS allowance. DAS may also act as supplementary measures to catch quotas.
    - FISHERY CLOSURES ban all or specified gear classes from fishing a particular stock/area for a specified time. They are most commonly used in fisheries without quota limits when biological indicators suggest that overfishing could threaten spawning stocks or identify other ecological

reasons. Fishery closures are also put in place once quotas have been exhausted or significantly depleted.[4]

Figure 1: Types of fishing opportunities (summary from NEF: 'Who Gets to Fish')[5]

		Instrument	Control	Unit
QM		National Quotas	Output	Catch
		Rationed Quotas	Output	Catch
	RBM	Individual Quotas	Output	Catch
		Individual Transferable Quotas	Output	Catch
		Community Quotas	Output	Catch
EM		Individual Effort Quotas	Input	Effort
		Territorial Use Right for Fisheries	Input	Area
		Limited licensing	Input	Capacity
		Spatial management	Input	Area
		Fishing seasons	Input	Effort
		Days at sea	Input	Effort
		Fishery closure	Input	Effort

Note: All fishing opportunities can be classed as either a type of quota management (QM) or effort management (EM) depending on whether they are a form of output or input control. Some fishing opportunities are classed as RBM as defined above.

Allocation of fishing opportunities:

The allocation of fishing opportunities is the process by which government authorities distribute fishing quotas to fishers or intermediaries such as producer organisations. *Annex 1 provides an overview of the origins and outcomes of the UKs Fixed Quota Allocation (FQA) system*.

There are four main approaches to allocation used in the EU:

1. Historical track record. Fishers are granted a share of the national quota depending on their historical landings during a reference period. They receive the same share allocation each year unless their share is transferred.

2. Capacity-based allocation. Fishers receive a share of the national quota based on the capacity (gross tonnage or power) of their vessel(s). As long as vessel characteristics stay the same, the share received each year will also remain constant.

3. Criteria-based allocation. Quotas are allocated based on criteria which may include the above two allocation methods. Other criteria may include socio-economic factors such as employment provision or quota dependency, or environmental criteria (such as gear impacts or fuel use) to determine allocation. (*See section 3*).

4. Rationing. Quotas are allocated based on objectives such as equal distribution or maximising utilisation. This allocation is often differentiated by gear and/or capacity

classes. Rationing is usually performed recurrently throughout the year with frequent adjustments. [6]

Quota management in the UK is split between the over 10 metre 'sector' (98% of the quota), the 'under 10 metre' fleet and 'non-sector' fleets. Sector fishers are members of producer organisations (POs – see Table 1)[7] who manage their members' quotas whilst under 10 metre and non-sector fishers' quotas are managed by the respective administration, e.g. the Marine Management Organisation (MMO) in England. The non-sector comprises a group of larger vessels that have not joined POs. The sector also includes a small number of under 10 metre vessels.[8]

In England, Inshore Fisheries and Conservation Authorities (IFCAs) have a role in managing fisheries in the 0-6 mile zone, alongside the MMO, but IFCAs do not have a role in quota management.[9]

Since 1999 the UK has used a system of Fixed Quota Allocations (FQAs – described in ***Annex 1***) as the basis for distributing quotas to fishers. This is a quota-share system whereby fishers receive a fixed share (or %) of the national quota every year. FQAs are unitless (*to an extent arbitrary*) values attached to fishing licences representing the share of quotas they are eligible to.

Allocation process: Once EU total allowable catches (TACs) have been set following the December Council meeting of Fisheries Ministers[10], national TACs are converted into UK fishing quotas according to the holdings of FQAs by licence holders. FQAs were determined using the average landings of fishing vessels between 1994 and 1996. FQA ownership is published in an online FQA register[11]. Most fishers do not manage their quotas themselves (sector fishers often have their FQAs managed by their PO and non-sector fishers have their FQAs controlled by the fisheries administrations), the MMO ''Quota Pool". POs are responsible for ensuring that by the end of the year landings are reconciled with quotas. POs may also hold FQAs on *dummy licences*, which allow POs to hold quotas not attached to a vessel, allowing members to fish out of a pool instead of against their individual quotas for some stocks. POs are also responsible for facilitating transactions in FQAs. Fisheries administrations hold FQAs of non-sector and under 10 metre fishers collectively in a pool. They set individual monthly limits for these fishers throughout the year in accordance with the annual quotas.[12]

There are 24 POs that manage quota in the UK, shown in Table 1 below. POs are membership-based organisations in the form of cooperatives companies that act on behalf of their members. They are set up under the Common Organisation of Markets[13] (CMO regulation) and operate to collectively manage the activities of their members, help them match supply and demand, and support them in creating added value. Defra and the MMO ensure that producer organisations comply with national and EU rules.

Table 1: list of UK POs[14] that manage quota.

1	Anglo-North Irish Fish Producers Organisation (ANIFPO)
2	Cornish PO

3	South West PO
4	The Fish PO (FPO)
5	Anglo Scottish
6	Northern Ireland Fish Producers Organisation (NIFPO)
7	Aberdeen Fish Producer's Organisation
8	Scottish Fishermen's Organisation (SFO)
9	Fife PO
10	North East of Scotland Fishermen's Organisation (NESFO)
11	Eastern England Fish Producers' Organisation (EEFPO)
12	Shetland PO
13	Fleetwood PO
14	Lowestoft PO
15	North Sea PO
16	Wales & West Coast PO
17	Northern PO
18	West of Scotland PO
19	Orkney PO
20	Isle of Man PO
21	Klondyke
22	Interfish
23	North Atlantic Fish Producers Organisation (NAFPO)
24	Lunar

The ***Coastal Producer Organisation*** (the CPO) is a one member, one vote co-op of the UK's fishermen. The PO was officially recognised by the Marine Management Organisation in July 2017[15], which means the PO has an official seat at the UK's fishing policy table. The PO gives the small-scale, inshore fishers who are members a collective voice.[16] Coastal PO membership is currently 260 members, covering 280 vessels. The Coastal PO a member of UKAFPO (the UK Association of Fish Producers Organisations), recognised 2017 by MMO and asking for all vessels in membership to be moved onto PO licenses. This move would mean vessels could retrospectively acquire quota when they return from sea (which they currently cannot) which means they are not discarding any over quota fish (or fishing illegally) and the PO could then make use of that quota to ensure the fish are landed and sold rather than discarded. This is being trialled currently to demonstrate (in Hastings) to test the viability.[17]

Options for the NDMP regarding quota:

- The current MMO quota pool allocated the same amount per vessel and month and the flexibility and seasonality of this allocation could be informed by better landings data (for example on the seasonal landings of different species of ray or smoothounds). This could inform a discussion with the MMO regarding monthly 'underfishing' of particular quotas and levels of "quota uptake" (*the percentage of quota for each stock per month which is actually fished*) to ensure that quotas are not exceeded but that opportunities that are within sustainable limits are taken

advantage of. Theoretically, if these quotas in the NDMP are underfished that would improve the stock but the beneficiaries of any quota increases the subsequent year would be FQA holders, which means the NDMP fleet experience the short term cost of fishing less but they also lose the benefit of having access to more quota the following year if the stock improves. *In terms of closing a fishery when all the quota is used, this is what the MMO would do if the annual limit of any particular stock had been reached before the end of the year. MMO data on uptake by month needs to be published.*

- To increase their opportunities, fishers in the NDMP area could join a PO (e.g. the Coastal PO). The Coastal Producer Organisation could work with the Marine Pioneer and NDFA to encourage the government to reallocate quota post EU exit. 'Fish producers' could sign up via the Coastal PO website and join (this requires an online form and a nominal fee charge). The quota scheme will have a separate annual fee. *These discussions have begun and are described in the outputs from NDMP workshops with the fishing industry – and while feasible, the next step should include a visit from the Coastal PO to the next NDFA meeting or NDMP stakeholder group meeting to discuss practicalities.*
- To increase their opportunities fishers in the NDMP area could set up a PO (the ND PO) and charge for membership. The process of MMO recognition may take some time but this would enable the fishers to lease quota. *However, a pre-requisite for setting up a PO is landing 5,000 tonnes of quota fish per year or 200 members, which means this option is not available to the NDMP fleet unless they draw in vessels from other ports to raise their membership and landings.*[18]
- Individual fishers could lease Quota (from other POs, such as the Cornish PO or the SWPO). Fishing license holders can apply to lease extra quota from a PO to supplement catch limits or to keep fishing a stock where the 10-metres-and-under or non-sector pool allocation has been used. *If quota allocations have not been confirmed it is still possible to lease quota from a PO. Each PO should submit a leasing request to the MMO using the letter template provided on the MMO website.* [19]
- Moving to a Days and Sea (DAS) regime for the NDMP area would not work for any of the quota species fisheries, but could possibly be applied to Scallops. However, following the recommendations of the Natural Capital Committee (NCC) a step change in fisheries management to minimise the effects of different types of fishing activities on other natural capital assets is needed. *Some recommendations (#2, #3 and #4) would actually suggest that dredging for scallops be excluded entirely from the NDMP area.* [20] *Furthermore as there is no stock assessment for scallops in the NDMP area, it is possible that once a DAS regime starts a supporting stock assessment may actually limit the DAS to a point that the fishery is not viable as the days at sea effectively become the choke.*[21]
- As NEF have argued for years, the way to overcome the issues is via quota reallocation – e.g. reallocating fishing quotas to lower-carbon fleets would deliver an additional 14,584 jobs and save 624,000 tonnes of carbon per year. *It is not*

realistic to fully allocate quotas according to a single criterion, but it is possible allocate shares of the quota. The current quota system is highly concentrated, so small allocations of 5% to 10% could bring huge economic benefits. [22]

Annex 2 shows how quotas are managed for some stock of interest to fishers in the NDMP area

Annex 3 shows the monthly quota available for key species of interest to fishers in the NDMP ports (ICES VIIe and VIIf)

SECTION 2: A SUMMARY OF LOCAL FISHERIES MANAGEMENT MEASURES

Fisheries management occurs on two different scales around England. Beyond 6 nM (nautical miles), Defra and the MMO are responsible for managing fisheries whereas from the coast out to 6 nM, the responsibility lies with IFCAs.[23] The Devon and Severn IFCA (D&SIFCA) manages the inshore area of the NDMP area, but the NDMP extends beyond the 6nM limit and therefore also into MMO responsibility.

There are specific byelaws which apply within the D&SIFCA district:

- The overall vessel size limit within the D&SIFCA district is limited to a maximum of 15.24m. [24]
- Vessel Monitoring Systems (VMS) is mandatory for all Mobile Fishing Vessels above 6.99m operating in the D&SIFCA district
- D&S IFCA byelaws are activity based. For each activity, permits are issued under the byelaw and with these permits there are conditions, which manage fishing activities in the district. These will include size limits, spatial restrictions, temporal restriction, gear restrictions pertinent to the activity and to the MPAs.
- D&SIFCA byelaws, which apply to the Lundy MCZ / Bideford to Foreland Point MCZ / Hartland Point to Tintagel MCZ.[25] In Lundy Island No Take Zone, the removal of any sea fisheries resources is prohibited under Byelaw. Spiny lobsters are designated feature of the Lundy MCZ and the Bideford to Foreland Point MCZ and their removal is prohibited under D&S IFCA's Permit Byelaws.

There are also byelaws, which are gear specific and apply to the whole of D&S IFCA district:

MOBILE GEAR [26] - Mobile Fishing Permit Byelaw

- Does not apply to vessels under 6.99m in length.

- Minimum size (100mm) applies to Scallops
- Scallop dredging is not authorised within the District, using any dredge except; a) one fitted with a spring-loaded tooth bar and; b) the mouth does not exceed 85cm width overall and; c) where rings are used in the construction of a retaining bag these shall not be less than 75mm measured across the inside diameter and; d) where net is used in the construction of a retaining bag it shall have a minimum mesh size of 100mm and; e) the size of the ring or net mesh of the retaining bag shall not be obstructed or otherwise reduced.
- A permit holder is not authorised to use a vessel within the District operating more than 12 dredges at any one time and; a) where multiple dredges are used, the length of the tow bar, including attachments shall not exceed 5.18 metres.
- Spatial Restrictions: in Lundy SAC and Lundy MCZ a permit holder or named representative is not authorised to use demersal mobile fishing gear except where; a) access is authorised for demersal trawl gear in the areas b) access is authorised for demersal scallop gear in certain areas.
- Time Restrictions: A permit holder is only authorised to use scallop dredge gear within the District between 7am and 7pm
- Seasonal Restrictions: A permit holder is not authorised to remove from a fishery within the District any scallop (*Pecten maximus*) during the period of July, August, September. A permit holder is only authorised to use demersal trawl gear in certain areas between 1st April and 30th June (inclusive).

NETTING [27]

- A permit holder is not authorised under this permit to remove from a fishery within the District: i) a bass less than 42cm measured from the tip of the snout to the end of the tail fin.
- Gear Restrictions: A permit holder is only authorised under this permit to use a net within the District if: a) each net is clearly marked by at least one floating marker at either end of the net; and b) each of the markers must display clearly the port, letters and numbers of the vessel named on the permit; or c) in the case of a Category Two Permit holder each of the markers must display clearly the permit number; and d) in each case where a fixed net is used the fixed net consists of a flag on at least one end of the net; and e) in each case where tags are issued by the Authority, a tag is fixed to one end of the headline of the net.
- A permit holder is not authorised to use a net within the mesh size range 71 to 89mm.

- Where a permit holder is authorised under Netting Permit Byelaw 2016 to use a seine net within the District, the Permit holder or named representative must: a) remain in attendance with the net for the entire duration that the net is deployed in the water; and b) deploy and haul the net in one continuous action without pause or delay.

- In the areas as defined by the coordinates set out in the Annex 1 of this permit (Lundy, Skerries Bank and Surrounds, and Bideford to Foreland Point Marine Conservation Zones), a permit holder or named representative is not authorised to remove any spiny lobster.
- In the Rivers Taw and Torridge to the landward of the coordinates set out in the Annex 2 of the netting permit, a permit holder or named representative is not authorised to use any net other than a seine net
- In the coastal areas as defined by the coordinates set out in the Annex 3 of this permit, a permit holder or named representative is only authorised to use a net where;
    A. the headline of the fixed net is set at least 3 metres below the surface of the water at any state of the tide;
    B. the net used is a seine net; or
    C. the net used is a drift net.
- In the areas as defined by the coordinates set out in the Annex 4 of this permit (Lundy Island), a permit holder or named representative is not authorised to use any net.

A permit holder or named representative is authorised to use fixed nets in the area 'Berrow Flats' (in Somerset) set out in Annex 5 to this Permit between 30th September and 1st April.

POTTING [28]

- A permit holder is not authorised under this Permit to remove from a fishery within the District: a) any 'V'-notched or mutilated lobster; b) any berried lobster or berried edible crab; c) any part of an edible crab or lobster or spiny lobster which is detached from the carapace of the crab or lobster; d) any edible crab or lobster or spiny lobster that has recently cast its shell;
- A permit holder is not authorised under this Permit to remove from a fishery within the District: a) a female edible crab less than 150mm measured across the broadest part of the carapace; b) a male edible crab less than 160mm measured across the broadest part of the carapace; d) a whelk less than 45mm measured along the length of the shell, e) a lobster less than 90mm measured as the length of the carapace, parallel to the midline, from the back of either eye socket to the

distal edge of the carapace; f) a spider crab less than 130mm measured as the length of the carapace, along the midline, from the edge of the carapace between the rostrums to the posterior edge of the carapace; g) a spiny lobster less than 110mm measured as the length of the carapace from the tip of the rostrum to the midpoint of the distal edge of the carapace; h) a velvet swimming crab less than 65mm measured across the broadest part of the carapace;

- A Category One permit holder using a named vessel without a shellfish fishing entitlement set out in Section 3 of the vessel's General Fishing Licence is not authorised to remove from a fishery within the District in any calendar day more than: a) a total of five lobsters, however comprised, from the species of lobster or spiny lobster, and b) a total of twenty-five crabs, however comprised, from the species of edible crab, spider crab, velvet swimming crab and green crab.
- A Category Two permit holder or named representative is not authorised under this Permit to remove from a fishery within the District in any calendar day more than: a) a total of two lobsters, however comprised, from the species of lobster and spiny lobster, and b) a total of three crabs, however comprised, from the species of edible crab and spider crab.
- During the period specified a permit holder is not authorised to use for the purpose of fishing for crab, lobster or spiny lobster, within the District any pot where the entrance or entrances to the pot or internal chamber of the pot are constructed from netting and are designed to prevent shellfish exiting unless; a) the pot is fitted with an escape gap or; b) where a chamber is present, the chamber is fitted with an escape gap.
- Any escape gap must; a) be located in the exterior wall of the pot or in the case of a multiple chambered pot each individual chamber must have an unobstructed escape gap located in its exterior wall; b) be of sufficient size that there may be passed through the gap a rigid, box shaped gauge, 84 millimetres wide by 46 millimetres high and 100 millimetres long; and c) be fitted in such a way that the longest side of the gap is parallel to the base of the pot and is located in the lowest part of the chamber as is practically possible, other than in the bottom.
- Time Restrictions: A permit holder is not authorised to use a pot within the District, for the purpose of fishing for crab, lobster and spiny lobster between 1st April and 31st December (inclusive) unless it is used in accordance with paragraph 2.1 of the permit relating to the requirement to have an escape gap fitted.

- A Category One permit holder is not authorised under this Permit to use a pot, for the purpose of fishing for live wrasse within the District, between 1st May and 15th July (inclusive).
- A permit holder is only authorised to remove from a fishery within the District, whelk of a size specified (1st November 2018: 55mm, 1st November 2020: 65mm)[29]

Table 2: D&SIFCA byelaws of relevance to the NDMP[30]

Site	Name / date	Management Name	Description
MCZ	Bideford to Foreland Point (2014)	Mobile Fishing Permit Byelaw	Management may include zoned closures for mobile gear around features. Management via permit conditions in place for the prohibition of the removal of spiny lobsters by mobile gear. In August 2018 there was a change to permit conditions resulting in all vessels greater than 6.99m being required to have iVMS or VMS fitted to vessels. This is a district wide condition but will allow the IFCA to monitor activity within the MPAs if required.
MCZ	Bideford to Foreland Point (2018)	Netting Permit Byelaw	This is a district wide byelaw. A condition of the byelaw for this site is the prohibition of spiny lobster, which is a feature of the site.
MCZ	Bideford to Foreland Point (2015)	Potting Permit Byelaw	This is a district wide byelaw A permit condition for this site is a prohibition of the removal of spiny lobsters, which is a feature of the site.
MCZ	Bideford to Foreland Point (2015)	Diving Permit Byelaw	This is a district wide byelaw A permit condition for this site is a prohibition of the removal of spiny lobsters, which is a feature of the site.
MCZ	Bideford to Foreland Point (in progress)	Hand Gathering Permit Byelaw	Byelaw development stage
MCZ	Hartland Point to Tintagel (2014)	Mobile Fishing Permit Byelaw	Management may include zoned closures for mobile gear around features. MCZ assessments currently underway. In August 2018 there was a change to permit conditions resulting in all vessels greater than 6.99m being required to have iVMS or VMS fitted to vessels. This is a district wide condition but will allow the IFCA to monitor activity within the MPAs if required.
MCZ	Hartland Point to	Potting Permit Byelaw	This is a district wide byelaw

	Tintagel (2015)		
MCZ	Hartland Point to Tintagel (2018)	Netting Permit Byelaw	This is a district wide byelaw
MCZ	Hartland Point to Tintagel (2015)	Diving Permit Byelaw	This is a district wide byelaw
MCZ	Hartland Point to Tintagel (in progress)	Hand Gathering Permit Byelaw	Byelaw development stage
MCZ	Lundy (2003)	Lundy No Take Zone Byelaw	No Take Zone in part of the Lundy SAC and MCZ. This covers all types or fishing, commercial and recreational. Prohibition by potting, netting and mobile gear have been included in the associated permit byelaws however, this byelaw is still current as a stand alone byelaw as not all methods of fishing within this legacy byelaw have been covered by the current IFCA permit byelaws.
MCZ	Lundy (2014)	Mobile Fishing Permit Byelaw	This is a district wide byelaw A permit condition for this site is a prohibition of the removal of spiny lobsters, which is a feature of the site. In August 2018 there was a change to permit conditions resulting in all vessels greater than 6.99m being required to have iVMS or VMS fitted to vessels. This is a district wide condition but will allow the IFCA to monitor activity within the MPAs if required.
MCZ	Lundy (2015)	Potting Permit Byelaw	This is a district wide byelaw A permit condition for this site is a prohibition of the removal of spiny lobsters, which is a feature of the site.
MCZ	Lundy (2018)	Netting Permit Byelaw	This is a district wide byelaw A permit condition for this site is a prohibition of the removal of spiny lobsters, which is a feature of the site.
MCZ	Lundy (2015)	Diving Permit Byelaw	This is a district wide byelaw A permit condition for this site is a prohibition of the removal of spiny lobsters, which is a feature of the site.
MCZ	Lundy (in progress)	Hand Gathering Permit Byelaw	Byelaw development stage

SECTION 3: ENVIRONMENTAL CRITERIA WHICH COULD BE USED TO ALLOCATE FISHING OPPORTUNITIES

The NCC advice on 'Marine and the 25 Year Environment Plan' (2019)[31] recommends extending and expanding the UK's MPAs and to consider banning fishing and other disruptive activities in order to allow greater recovery of fish stocks and other natural capital. This should include actions to minimise the effects of different types of fishing activities on other natural capital assets, with the aim of recovering and improving marine natural capital in the seabed, reducing disturbance to the seabed and concludes that a prohibition of trawling and dredging inside and near all UK protected areas is justified on natural capital grounds. Clearly, there is a need to reduce the use of destructive fishing gears, and favour lower impact types of fishing. The status of the NDMP as a UNESCO Biosphere suggest management should focus on the wider ecosystem impacts of fishing, aiming to maximise the conservation gain. Implementing fishing behaviour that is more sustainable, with associated marketing of sustainable products to the consumer is presented by the NCC as the long-term benefit of this approach. The NCC wants to make use of the experience being gained and lessons learned in the Marine Pioneer projects and the NDMP are in the process of developing a 'local marine 25 YEP delivery plan' to address these issues. The NDMP has developed a 'marine natural capital plan', which is the local 25-year plan delivery framework.[32]

In addition, the Fisheries White Paper makes extensive mention of the need to favour low-impact fisheries, but these are not defined and therefore this ambition cannot be met without having objective, transparent and measurable criteria. Without a definition of low-impact fishing[33], the statements in the Fisheries White Paper and 25 Year Environment Plan are unlikely to lead to any changes in management. Indeed, the Fisheries Bill Clause 20 specifically legislates for allocation based on social, environmental and economic criteria.

In the NDMP area a variety of fishing gears are used to catch fish and shellfish and these gears evolve mainly with a focus on trying to reduce fuel use, catches of non-target species and any negative impacts on marine habitats. Considering how fish and shellfish are caught, alongside the health of the respective stocks, is consistent with a 'Natural Capital' approach[34].

For any given species there may be several major fishing techniques such as pots, nets, hooks, and trawls that use different amounts of energy (fuel) and have different impacts on the target / non-target species and wider marine ecosystem. The impacts of fishing gears on seabed ecosystems are a central component in *ecosystem-based fisheries management* and the *ecosystem approach* to fisheries management (guiding objectives of both the Fisheries White Paper and the 25 Year Environment Plan)[35]. The impacts on seabed features and species of different gear types is also a key consideration in the development of management measures and byelaws for MCZs and other MPAs.[36]

A new, meaningful definition to replace the current 'under 10 metre' and 'over 10m' distinction, which (while arbitrary) has shaped the industry, by impacting quota

availability and discarding, increased effort on non-quota species (e.g. bass or whelks), skewing the objective of decommissioning (by paying to scrap larger vessels to replace them with under 10m 'rule beaters' which had the same fishing capacity), and contributing to the demise of many smaller scale and sustainable fishing operations, is urgently needed.[37]

Figure 2: UK fishing gears (Carpenter, 2017)

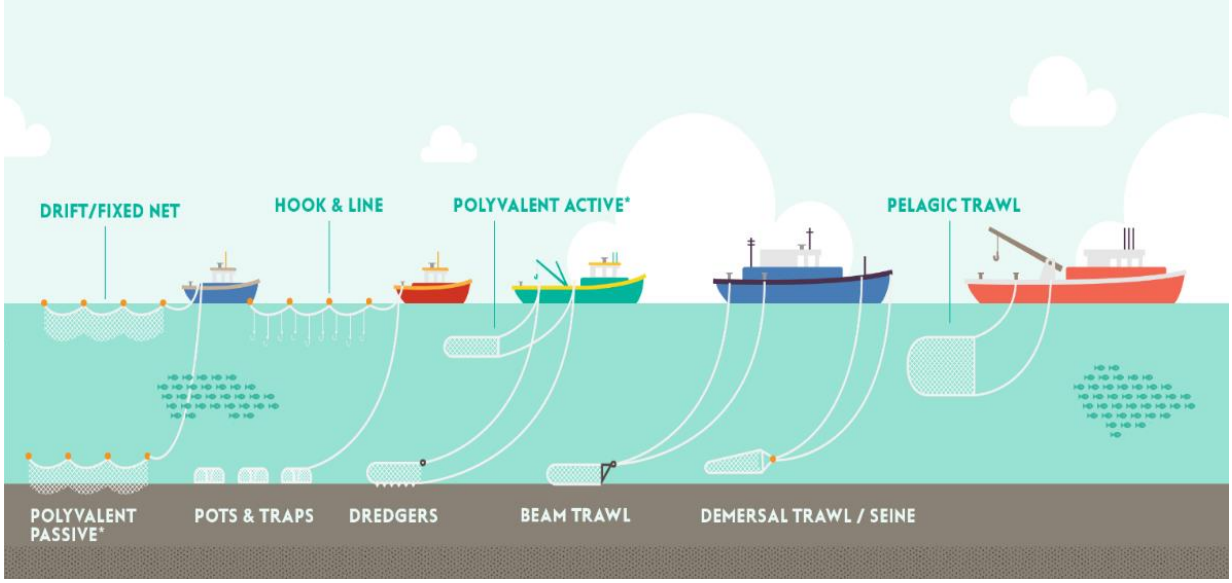


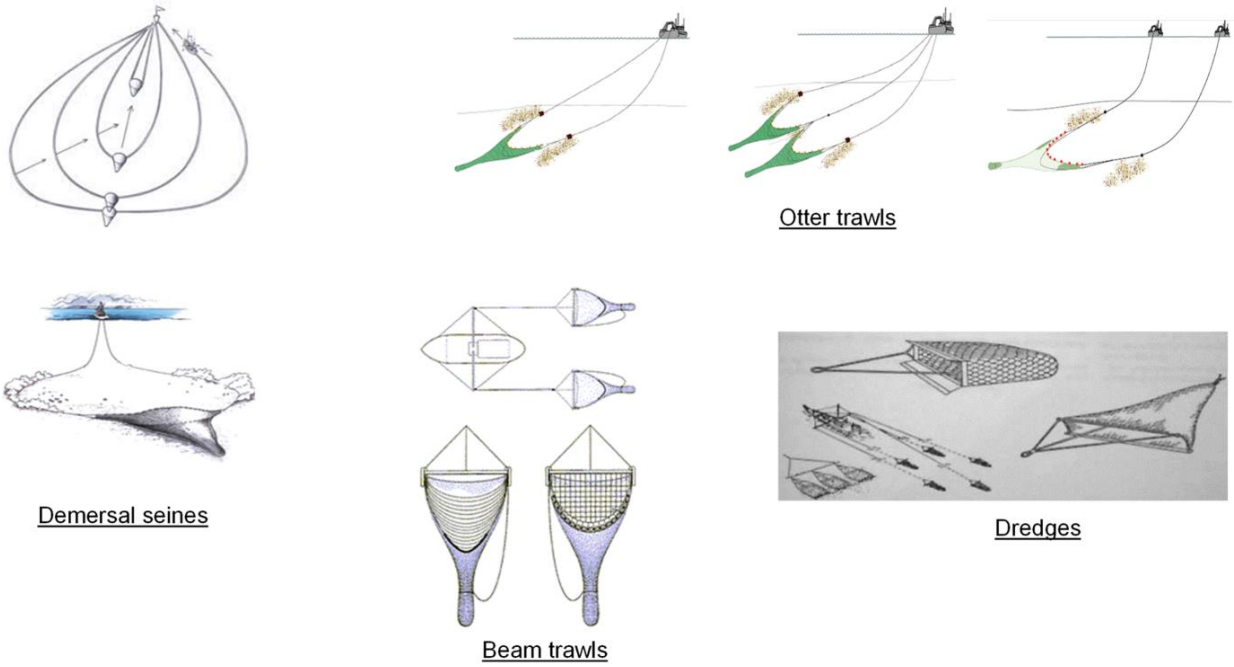
Figure 2 above shows the range of fishing gears used by the UK fleet. The main distinction is between *active* and *passive* gears. Active gears include trawls and dredges which are towed, whereas passive gears are those which are fixed or drift (these include fixed nets, drift nets, pots and traps as well as hook and lines). The selectivity, survivability of non-target catches, fuel use and impacts on the seabed are the main distinctions between active and passive gears, with active gears having a higher environmental impact.

In general terms, pots and traps are used in shellfish fisheries (e.g. crab, lobster, whelk) as are dredges (scallops), whereas nets, hook and line and trawls are used in finfish fisheries, whether demersal (seabed e.g. cod or sole) or pelagic (water column – e.g. mackerel or herring).

The reality of fishing in the UK is that many species can be caught by either active or passive gears. E.g. cod, sole and plaice could be caught using trawls and nets both and these gears also have different environmental impacts, from fuel use to bycatch[38]. Beyond simple distinctions between active (mobile) and passive (static) gear, the configuration of gears, their footprint and the mesh sizes and panels used also mean there are distinctions between similar gear types, which also determine their impact. These are further complicated by both the fishery (mixed or single species) and the location (grounds / habitat) where the fishing takes place as well as other factors, e.g. how the gear is towed, the weight of the gear etc[39]. For example, Figure 3 below shows schematics of how towed demersal mobile gear (trawls, seines and dredges) behave in

the water, thus indicating the 'footprint' (or area of contact with the seabed) of the different gears.[40] The impacts of these different gears have been estimated alongside the respective footprints for the North Sea and North Western waters[41].

Figure 3: Towing principles of the four main high-impact demersal gear groups identified: demersal seines (left), otter trawls (top right), dredges (bottom right), and beam trawls (centre, bottom). Source: FAO[42]



What criteria are appropriate to define low-impact fishing?

The criteria presented below cover the environmental impacts of fishing. Seven published studies were reviewed, which adopted environmental or ecological criteria, amongst others, applied to fisheries in the EU[43,44,] UK[45,46,47] or both[48].

Combining the findings of these research pieces and available gear databases, ten environmental criteria have been developed in table 3, which can be assessed to determine whether a fishery is *low impact*. Based on thresholds (each criterion can be scored and their cumulative total can be compared to determine whether they are low, medium or high impact) and weightings (some criteria may be deemed more important than others and weighted accordingly e.g. weighing discards more heavily that fossil fuel use) which should be developed with scientists, managers and fishers in the NDMP area, each vessel and the gear it is using can be defined as low, medium or high impact.

Table 3: Environmental-criteria to define low-impact fishing

Environmental Criteria	Description	Indicator	Data source
1. **Greenhouse gas emissions**	Fuel use from fishing generates greenhouse gas emissions, which contribute to climate change.	Kgs of CO2/kg landed weight	STECF data / Academia
2. **(Fossil Fuel) Subsidies**	The fishing industry receives subsidies in different forms[49]. This masks true performance and deprives governments of funds for other purposes.	£/Kg landed weight	STECF data
3. **Target species discards**	Discards result from undersized fish being caught. Depending on survivability when discarded this can increase fishing mortality.	Kgs of target species/kg of all species landed	Cefas / MMO / Academia
4. **Other bycatches and discards**	Discards of other (non-target) species result from undersized or non-commercial fish being caught. Depending on survivability when discarded this can increase fishing mortality.	Kgs of discards/kg landed weight	Cefas / MMO / Academia
5. **Spawning season mortality**	Fishing during particular seasons and in particular areas can damage a fish stock when it is reproducing. This leads to lower fish populations than would result from the fishing activity itself.	Spawning stock damage/Kg landed	Academia[50] / Cefas / IFCA and interviews
6. **Bycatch of other marine life**	Bycatch is the unintended capture of marine wildlife such as dolphins, birds, turtles or seals. This can damage or kill the captured wildlife.	RASS score (1 low risk - 5 high risk)	Seafish / Cefas / Academia
7. **Ecosystem damage**	Fishing activity can harm the marine environment and destroy habitats. This can lead to lower populations and a loss of biodiversity.	RASS score (1 low risk - 5 high risk)	MMO[51] / Seafish RASS / Cefas/ Seafish gear database

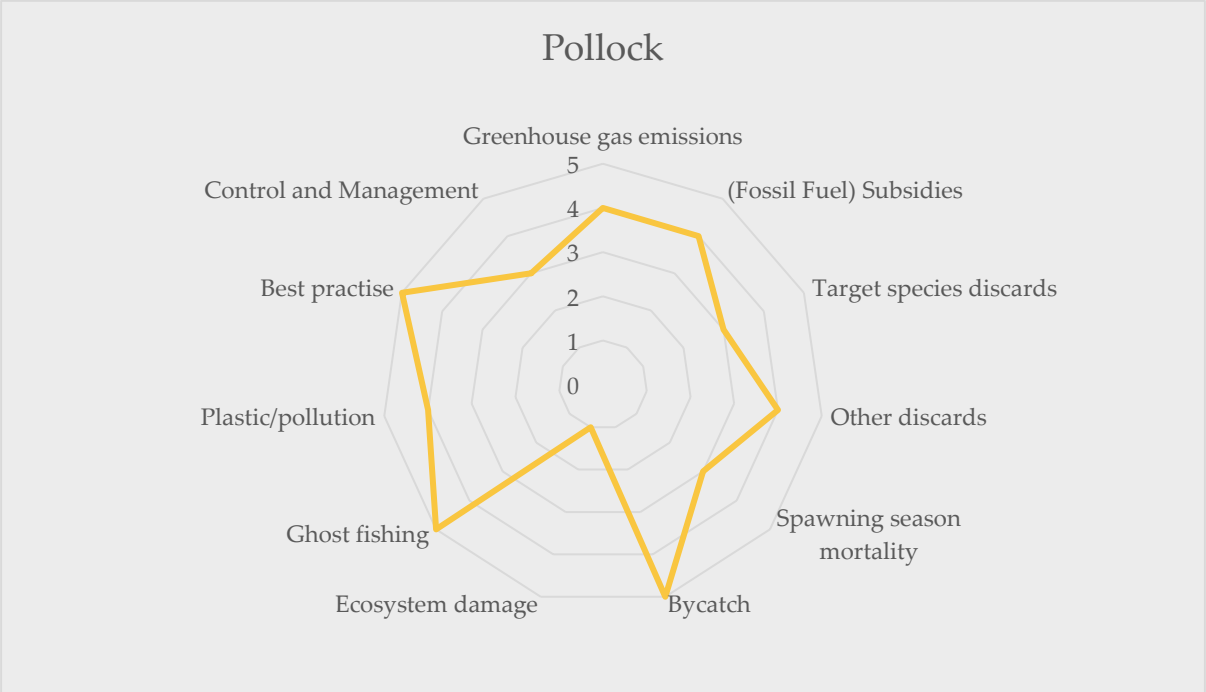
8. Ghost fishing	Ghost fishing occurs when fishing gear is lost in the water. This entangles fish and continues to cause fishing mortality.	Descriptive	Cefas / IFCA
9. Plastic/pollution	Fishing is one of the main contributors to marine plastics globally. Collection and recycling of fishing gear is necessary to reduce plastic pollution.	Recycling of nets (%) per annum	Fishers data / / MMO/ IFCA
10. Animal welfare (target species)	The way that target species are caught, handled and dispatched (and the speed at which that happens) needs to be considered.	Descriptive	Academia[52] / Cefas/ Seafish

Options for the NDMP:

- **The NDMP could co-develop weightings and thresholds** with fisheries, regulatory bodies and NGO stakeholders **for low impact fishing** in the NDMP area. Converting the data into a score of 1-5 is achieved in different ways depending on each criteria, for example, those scores applied to fishing gear interactions stem from the Seafish RASS already applies a 1-5 score. Other, more subjective, scores need to be agreed with practitioners and local mangers. As a hypothetical example, a static net fishery for Pollock is described (***please note this is an example only***). Weighting would involve deliberation to determine amongst NDMP members what the priority should be, and this may result is ecosystem damage and plastic pollution being given more weight versus GHG emissions (for example). The weightings would means higher scores for those criteria relative to others.

Ecological Criteria	Indicator	Fishery description (example only)	Pollock
Greenhouse gas emissions	kgs of CO2/kg landed weight	Mainly offshore wrecks high fuel use	4
(Fossil Fuel) Subsidies	£/kg landed weight	High fuel use per Kilo	4
Target species discards	kgs of target species/kg of all species landed	Catches of undersize pollock discarded	3

Other discards	kgs of discards/kg landed weight	Catches of bass	4
Spawning season mortality	spawning stock damage/kg bass landed	Fishing takes place mainly during spawning season	3
Bycatch	RASS score (1 low risk - 5 high risk)	Cetacean bycatch (porpoise)	5
Ecosystem damage	RASS score (1 low risk - 5 high risk)	Low as only anchors in contact with seabed	1
Ghost fishing	Descriptive	High risk as nets caught on wrecks	5
Plastic/pollution	recycling of nets (%) per annum	Nets lost at sea	4
Best practise	% science trips per annum	Currently none	5
Control and Management	Management plan at IFCA level / warning / caution / charges	Non quota species and no minimum sizes or closed season	3



- **The NDMP could ensure low impact fishers are given preferential access to fishing opportunities (quota and spatial access) in the NDMP area.** This may require formal spatial management and the separation of different gear types, vessel sizes or engine power. This should also be conditional on demonstrable compliance and adequate monitoring. Voluntary measures have been shown to be less effective and while preferable to Defra, are unlikely to have the same impact as regulation.
- **The NDMP could ensure low impact fishers are given priority access and the highest possible grant support intervention rate from any future subsidy to industry.** Future funding should be used to incentivise a shift towards lower

impact fishing overall, by provision of subsidies to those who wish to adapt their gear or vessel, but not to the detriment of those who already do.

- **The NDMP could incentivise vessels to shift to low impact fishing gears.** Overall fishing capacity should not increase as a result of the shift from high to low impact fishing. Adequate monitoring and demonstrable compliance should be a pre-requisite for receipt of any subsidised incentives.
- **Defra, the MMO or D&SIFCA could consider the advice from the NCC (2019) and Plymouth Marine Lab to develop a management plan, which prohibits the use of high impact fishing gears within the NDMP area, in-line with the *ecosystem* and *natural capital approaches*.**

ANNEX 1:

QUOTA MANAGEMENT in the UK: THE INITIAL ALLOCATION OF FQAs

"In 1999, the UK implemented a system Fixed Quota Allocations (FQAs) that granted fishers fixed shares of the national catch quota. Fishers who were members of producer organisations mainly using larger, over 10 metre vessels received individual quotas whilst non-members accessed a FQA pool managed by the government. The FQAs allocated were distributed to these individual fishers and pools based on fishers' track records – their past fishing activity in terms of tonnes landed using a reference period of 1994-1996. However, under 10 metre vessels were not required to report their landings over this period and the sampling methods used by the government to estimate the missing data has been criticised for underestimating the past landings of the under 10 metre vessels. Subsequently, the share of FQAs allocated to the under 10 metre pool was far lower than their actual historical activity.

This under-allocation has resulted in a number of problems for the under 10 metre fleet, including a shifting of activity and subsequent overfishing of non-quota species. and the leasing of FQAs from producer organisations at a significant financial cost. The end result has been that access for under 10 metre vessels has become more restricted and expensive, the small-scale sector is struggling financially with further repercussions for many fishing communities.

This example illustrates a number of key concerns. Firstly, it is crucial to get the initial allocation of fishing opportunities right in order to have equitable outcomes. This is especially true for systems like the UK where allocation is fixed indefinitely and the government has minimal means to make corrections. Secondly, it raises questions about the process of establishing FQAs and whether these problems could have been avoided with better consultations or co-management between government and stakeholders.

The UK maintains a differentiated quota system with individual quotas for the sector (members of producer organisations) and pooled quotas the level of the fisheries administrations for inshore and non-sector fishers. The quota system has some resemblances of a transferable system with an unregulated trade in FQAs occurring. Our analysis indicates that the UK performs well on security, flexibility and transparency, but performance is mixed and low for most other objectives".[53]

To remedy some of the problems NEF recommend[54] that the UK:

- Affirms public ownership of fish stocks and FQAs to ensure that access to the public resource remains under government control;
- Introduces a peer-to-peer quota swapping system that could provide greater flexibility in quota access whilst not monetising transactions;
- Improves access for new fishers either through lending or granting quota to young fishers wishing to enter the industry;
- Fully incorporates social and environmental criteria in its primary allocation method, or through using the national quota reserve;
- Implements a landings tax to recover management costs - with an aim to eventually recover a share of the resource rent - and reduces fuel tax exemptions;
- Differentiates this landings tax to favour landings in national ports to ensure that the use of a national resource benefits UK communities;
- Regulates the de facto individual transferable quota system to minimise negative impacts, or revert to an IQ system with no transfers permitted;
- Build on the withdrawal from the London Convention by prioritising access to inshore waters to low-impact fishing methods;
- Reallocates quota to the inshore fleet to address historic under-allocations and improve equity.[55]

ANNEX 2:

UK commercial quota species share of TAC and % leased / rationed (2017) in the Celtic sea and ICES area VIIe and VIIf.[56]

Stock name	Year	Share of stock in fisheries administration	Individual leasable quota	Individually rationed quota pool	Rationed individual quota	Year of introduction
Atlantic Cod Celtic Sea	2017	10	73	27	0	1983

Atlantic cod Irish Sea	2017	25	95	5	0	1983
Common sole Celtic Sea	2017	22	100	0	0	1983
European Plaice ICES VIIe	2017	72	78	22	0	1983
European Plaice ICES VIIf-g	2017	6	81	19	0	1983
European Plaice Irish Sea	2017	18	83	17	0	1983
European seabass IVbc and VII	2017	32	0	0	100	2016
Haddock ICES VIIb-k	2017	9	96	4	0	1983
Haddock Irish Sea	2017	54	91	9	0	1983
Herring ICES VIIa-g-h-j	2017	21	99	1	0	1983
Mackerel ICES Northeast Atlantic	2017	24	99	1	0	1983

ANNEX 3:

Current catch limits (2019) for the under 10m pool (MMO)[57]

Stock (species and area)	**Catch limit (tonnes)**

Angler - Area VII	5
Cod - Areas VIIb-k (excluding VIId) - BYCATCH ONLY	0.15
Haddock - Areas VIIb-k	2
Hake - Western	5
Herring - Areas VIIe and VIIf	15
Mackerel - Western	1
Megrim - Area VII	2
Plaice - Areas VIIf and VIIg	4
Pollock - Area VII	10
Saithe - Areas VII, VIII, IX, X and CECAF 34.1.1	2
Skates and rays - Areas VI and VII (excluding VIId)	10
Small-Eyed Ray - Area VIIf&g - and to be included in the total catch for Areas VI & VII exc.d	2
Undulate Ray - Area VIId&e	Closed

Current catch limits (2019) for the over 10 metre non-sector pool (MMO)[58]

Stock (species and sea area)	**Catch limit (tonnes)**
Angler - Area VII	2
Cod - Areas VIIb-k (excluding VIId) - BYCATCH ONLY	0.15
Haddock - Areas VIIb-k	2
Hake - Western	5
Herring - Areas VIIe and VIIf	0.1
Ling - Western	0.5
Mackerel - Western	0.5
Megrim - Area VII	1
Plaice - Areas VIIf and VIIg	1

Pollock - Area VII	10
Saithe - Areas VII, VIII, IX, X and CECAF 34.1.1	0.5
Skates and rays - Area VIId	0.8
Skates and rays - Areas VI and VII (excluding VIId)	10
Small-Eyed Ray - Area VIIf&g - and to be included in the total catch for Areas VI & VII exc.d	2
Undulate Ray - Area VIId&e	Closed
Sole - Areas VIIf and VIIg	0.3
Sprats - Areas (VIId and VIIe)	0.5
Picked dogfish (Spurdog) (all areas)	Closed
Whiting - Areas VIIb-k	6

ENDNOTES

[1] NEF (2017) Who gets to fish? The allocation of fishing opportunities in EU Member States https://neweconomics.org/uploads/files/Carpenter-Kleinjans-Who-gets-to-fish-16.03.pdf
[2] Ibid.
[3] Ibid.
[4] Ibid.
[5] Ibid.
[6] Ibid.
[7] https://www.gov.uk/government/collections/fish-producer-organisation-po
[8] NEF (2017) Who gets to fish? The allocation of fishing opportunities in EU Member States https://neweconomics.org/uploads/files/Carpenter-Kleinjans-Who-gets-to-fish-16.03.pdf
[9] NEF (2017) Who gets to fish? The allocation of fishing opportunities in EU Member States https://neweconomics.org/uploads/files/Carpenter-Kleinjans-Who-gets-to-fish-16.03.pdf
[10] Agriculture and Fisheries Council, 17-18/12/2018
Main results https://www.consilium.europa.eu/en/meetings/agrifish/2018/12/17-18/
[11] https://www.fqaregister.service.gov.uk/
[12] NEF (2017) Who gets to fish? The allocation of fishing opportunities in EU Member States https://neweconomics.org/uploads/files/Carpenter-Kleinjans-Who-gets-to-fish-16.03.pdf
[13] https://ec.europa.eu/fisheries/cfp/market_en
[14] https://ec.europa.eu/fisheries/sites/fisheries/files/list-of-recognised-producer-organisations-and-associations-of-producer-organisations.pdf
[15] https://fishingnews.co.uk/news/coastal-po-achieves-recognition/
[16] Coastal PO https://fish.coop/about/
[17] Coastal PO (pers. Comm.)
[18] Coastal PO (pers. Comm.)

[19] MMO 'leasing fishing quota' https://www.gov.uk/guidance/manage-and-lease-fishing-quota
[20] Natural Capital Committee (2019) Marine and the 25 Year Environment Plan https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/801512/ncc-advice-marine.pdf
[21] NFFO http://nffo.org.uk/news/are-days-the-answer.html
[22] https://neweconomics.org/2015/03/managing-eu-fisheries-in-the-public-interest
[23] Seafish. Southwest Crab & lobster pot FIP https://www.seafish.org/article/southwest-crab-lobster-pot-fip
[24] Devon and Severn IFCA Permit Byelaws and Conditions https://www.devonandsevernifca.gov.uk/Enforcement-Legislation/Current-Permit-Byelaws-Permit-Conditions
[25] Devon and Severn IFCA Permit Byelaws and Conditions https://www.devonandsevernifca.gov.uk/Enforcement-Legislation/Current-Permit-Byelaws-Permit-Conditions
[26] Devon and Severn IFCA Permit Byelaws and Conditions https://www.devonandsevernifca.gov.uk/Enforcement-Legislation/Current-Permit-Byelaws-Permit-Conditions
[27] Devon and Severn IFCA Permit Byelaws and Conditions https://www.devonandsevernifca.gov.uk/Enforcement-Legislation/Current-Permit-Byelaws-Permit-Conditions
[28] Devon and Severn IFCA Permit Byelaws and Conditions https://www.devonandsevernifca.gov.uk/Enforcement-Legislation/Current-Permit-Byelaws-Permit-Conditions
[29] Devon and Severn IFCA Permit Byelaws and Conditions https://www.devonandsevernifca.gov.uk/Enforcement-Legislation/Current-Permit-Byelaws-Permit-Conditions
[30] Devon and Severn IFCA
[31] Natural Capital Committee (2019) Marine and the 25 Year Environment Plan https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/801512/ncc-advice-marine.pdf
[32] Ibid.
[33] Article 4 of the CFP provides a definition of 'low impact fishing': "'low impact fishing' means utilising selective fishing techniques which have a low detrimental impact on marine ecosystems or which may result in low fuel emissions, or both;" https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1380&from=EN
[34] NCC (2018) Natural Capital Committee advice on government's 25 year environment plan https://www.gov.uk/government/publications/natural-capital-committee-advice-on-governments-25-year-environment-plan
[35] Defra (2018) Sustainable fisheries for future generations https://www.gov.uk/government/consultations/fisheries-white-paper-sustainable-fisheries-for-future-generations/sustainable-fisheries-for-future-generations-consultation-document
[36] UK Gov Guidance (2014) Understanding marine conservation byelaws: How byelaws are made and what they protect. https://www.gov.uk/guidance/marine-conservation-byelaws
[37] Davies et al. (2018) Does size matter? Assessing the use of vessel length to manage fisheries in England. Marine Policy. Volume 97, November 2018, Pages 202-210 https://www.sciencedirect.com/science/article/pii/S0308597X1830068X?via%3Dihub
[38] Crilly and Esteban (2013) Small versus large-scale, multi-fleet fisheries: The case for economic, social and environmental access criteria in European fisheries. Marine Policy. Volume 37, January 2013, Pages 20-27 https://www.sciencedirect.com/science/article/pii/S0308597X12000875#aep-abstract-sec-id15

[39] Seafish (a non-departmental public body set up to support the UK seafood industry) have an extensive gear database,[39] which describes and classifies fishing gears used by the UK fleet, links them to their main target fishery and describes their environmental impact. Seafish have also developed the 'Risk Assessment for Sourcing Seafood' (RASS)[39], which was developed to help UK commercial seafood buyers make informed judgements about the environmental risks they face when sourcing wild caught seafood. RASS profiles have been developed for the majority of species the UK fleet fishes for, which cover the stock status, management effectiveness, bycatch and risks to marine habitats. The full list of species covered by RASS profiles is available online.[39]

[40] Eigaard et al (2016) 'Estimating seabed pressure from demersal trawls, seines, and dredges based on gear design and dimensions', ICES Journal of Marine Science, Volume 73, Issue suppl_1, 1 January 2016, pp 27–43. https://academic.oup.com/icesjms/article/73/suppl_1/i27/2573989
[41] *Ibid.*
[42] UN FAO http://www.fao.org/fishery/geartype/search/en
[43] SOCIOEC project (2015) Final Report Summary - Socio economic effects of management measures of the future CFP. https://cordis.europa.eu/project/rcn/101825/reporting/en
[44] Nieto & Blomeyer Sanz (2015) Criteria for Allocating Access to Fishing in the EU https://www.researchgate.net/profile/Fernando_Nieto4/publication/275347471_Criteria_for_Allocating_Access_to_Fishing_in_the_EU/links/5539e6e20cf226723aba3643/Criteria-for-Allocating-Access-to-Fishing-in-the-EU.pdf
[45] Williams, Carpenter (2015) NEF working paper on sea bass (*Dicentrarchus labrax)* and article 17 of the reformed Common Fisheries Policy (CFP) https://www.researchgate.net/publication/284430910_NEF_working_paper_on_sea_bass_Dicentrarchus_labrax_and_article_17_of_the_reformed_Common_Fisheries_Policy_CFP
[46] Williams et al. (2018) Who gets to fish for sea bass? Using social, economic and environmental criteria to determine access to the English sea bass fishery. Marine Policy. https://www.researchgate.net/publication/324075041_Who_gets_to_fish_for_sea_bass_Using_social_economic_and_environmental_criteria_to_determine_access_to_the_English_sea_bass_fishery
[47] Williams and Carpenter (2016) NEF working paper The Scottish Nephrops fishery: Applying social, economic, and environmental criteria https://neweconomics.org/uploads/files/Griffin-Nephrops-latest.pdf
[48] Eigaard et al (2016) 'Estimating seabed pressure from demersal trawls, seines, and dredges based on gear design and dimensions', ICES Journal of Marine Science, Volume 73, Issue suppl_1, 1 January 2016, pp 27–43. https://academic.oup.com/icesjms/article/73/suppl_1/i27/2573989
[49] Direct subsidies: EU funding includes support fishers transitioning to more sustainable fishing and assist coastal communities in diversifying their economies. The UK has chosen to spend €19.3m of its EU funding on improving sustainability in the sector during 2014-2020.
Indirect subsidies: by not paying fuel duty and using 'red diesel', fishing vessels are receiving indirect subsidies that artificially enhance the viability of their businesses and the type of fishing they engage in.
[50] Van Overzee and Rijnsdorp (2014) Effects of fishing during the spawning period: implications for sustainable management. Rev Fish Biol Fisheries DOI 10.1007/s11160-014-9370-x
[51] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/310811/matrix.xls
[52] Browman et al. (2019) Welfare of aquatic animals: where things are, where they are going, and what it means for research, aquaculture, recreational angling, and commercial fishing, ICES Journal of Marine Science, Volume 76, Issue 1, 1 January 2019, Pages 82–92, https://doi.org/10.1093/icesjms/fsy067
[53] NEF (2017) Who gets to fish? The allocation of fishing opportunities in EU Member States https://neweconomics.org/uploads/files/Carpenter-Kleinjans-Who-gets-to-fish-16.03.pdf
[54] NEF (2017) Who gets to fish? The allocation of fishing opportunities in EU Member States https://neweconomics.org/uploads/files/Carpenter-Kleinjans-Who-gets-to-fish-16.03.pdf

[55] NEF (2018) A FAIR FISHING DEAL FOR THE UK - HOW TO MANAGE BRITISH FISHERIES IN THE PUBLIC INTEREST https://neweconomics.org/uploads/files/Fair-Fishing-United-Kingdom.pdf
[56] Split based on PO and non-PO share MMO - Fisheries quota allocation 2016: https://www.gov.uk/government/publications/fisheries-quota-allocation-1262 ; Lease information: https://www.gov.uk/guidance/manage-and-lease-fishing-quota; Source for stock share: ICES landings by country

[57] MMO (2019) Statutory guidance - Current catch limits 10 metres and under pool 2019 https://www.gov.uk/government/publications/current-catch-limits-10-metres-and-under-pool
[58] MMO (2019) Current catch limits over 10 metre non-sector pool 2019 https://www.gov.uk/government/publications/current-catch-limits-over-10-metre-non-sector-pool/s